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SCIENCE & TECHNOLOGY

GLOBAL

[Carbon Capture and Storage into Oceans](#)

Lehigh Engineering researchers have developed a novel way to capture carbon dioxide from the air and store it in the "infinite sink" of the ocean. The approach uses an innovative copper-containing polymeric filter (hybrid sorbent containing polyamine-Cu(II) complex, Polyam-N-Cu₂⁺, that exhibits a high CO₂ capture capacity at the ultra-dilute concentration of CO₂), and converts CO₂ into sodium bicarbonate (aka baking soda) that can be released harmlessly into the ocean. This new hybrid material, or filter, is called DeCarbonHIX (i.e., decarbonization through hybrid ion exchange material). The research demonstrated a 300 percent increase in the amount of carbon captured compared with existing direct air capture methods. DeCarbonHIX uses a mechanically strong, chemically stable sorbent (a material used to absorb liquids or gasses) -- that contains copper. The process starts with air blowing through the filter to capture CO₂. Once the filter is saturated with gas molecules, seawater is passed through the filter. The seawater converts the carbon dioxide to sodium bicarbonate. The dissolved sodium bicarbonate is then released directly into the ocean. The sodium bicarbonate, which is slightly alkaline, may improve the health of the ocean and counter acidification. DeCarbonHIX can also be desorbed with hot water or steam, and pure CO₂ can be recovered, compressed, and stored underground in geological storage.

[New Frequency Comb Breathalyzer Detects Covid-19](#)

JILA researchers at University Of Colorado have upgraded a breathalyzer based on frequency-comb technology and combined it with machine learning to detect SARS-CoV-2 infection with excellent accuracy in 170 volunteer subjects. JILA's frequency comb breathalyzer identifies chemical signatures of molecules based on exact colours and amounts of infrared light absorbed by a sample of exhaled breath. The added benefit to this study was the use of machine learning which processes and analyses a massive, collection of data from all the breath samples to create a predictive model to diagnose disease. The JILA comb breathalyzer method demonstrated excellent accuracy for detecting COVID by using machine learning algorithms on absorption

patterns to predict SARS-CoV-2 infection. H₂O (water), HDO (semi-heavy water), H₂CO (formaldehyde), NH₃ (ammonia), CH₃OH (methanol), and NO₂ (nitrogen dioxide) were identified as discriminating molecules for detection of SARS-CoV-2 infection.

SARS-Cov-2 Infection Accelerates Progression of Dementia

According to new research published in the Journal of Alzheimer Studies, infection with SARS-CoV-2 has a significant impact on cognitive function in patients with pre-existing dementia. Patients with all subtypes of dementia included in the study experienced rapidly progressive dementia following infection with SARS-CoV-2. Researchers investigated the effects of COVID-19 on cognitive impairment in 14 patients with preexisting dementia (four with Alzheimer's disease [AD], five with vascular dementia, three with Parkinson's disease dementia, and two with the behavioural variant of frontotemporal dementia), who had suffered further cognitive deterioration following COVID-19. In addition to finding that all subtypes of dementia, irrespective of patients' previous dementia types, behaved like rapidly progressive dementia following COVID-19, the team found that the line of demarcation between different types of dementia became remarkably blurry post-COVID-19. Researchers also found that the characteristics of a particular type of dementia changed following COVID-19, and both degenerative and vascular dementia started behaving like mixed dementia both clinically and radiologically.

Researchers Leverage Cell Self-destruction to Treat Brain Tumours

Medical researchers at the University of North Carolina Health Care have found that glioblastoma tumour cells are particularly sensitive to ferroptosis -- a type of cell death that can be triggered by removing certain amino acids from the diet. The team found that when certain amino acids in animal models were taken away, the glioblastoma cells were more likely to die by ferroptosis. Removing these amino acids makes drugs more effective at inducing ferroptosis in cancer cells. By depriving animal models of cysteine and methionine through a customized diet, they found that the glioblastoma cells were significantly more likely to die via ferroptosis. They also found that the diet made their chemotherapy drugs more apt at initiating programmed cell death, meaning that very low doses were able to achieve a more potent effect than before. Ultimately, the animal models had improved survival after going on the diet. This type of diet has also shown to be very effective in sarcoma, lung cancers, and pancreatic cancers, so there is hope that this diet can be used to put some extra umph behind chemotherapy and/or surgery to remove tumours throughout the body.

China's 'EAST Reactor Breaks Record

China's "artificial sun" set a world record on 12 April by generating and maintaining extremely hot, highly confined plasma for nearly seven minutes. The Experimental Advanced Superconducting Tokamak (EAST) in the city of Hefei in eastern China generated and sustained plasma for 403 seconds, breaking its previous record of 101 seconds in 2017 and marking another key step towards thermonuclear fusion reactors. The main significance of this breakthrough lies in its high-confinement mode', under which the temperature and density of the plasma increase significantly. EAST, which began operating in 2006, has conducted more than 120,000 experiments to reach the latest milestone. EAST is a superconducting tokamak with powerful magnetic fields used to confine super-hot plasma in a doughnut-shaped space and force it to combine over time. China is also a member of the International Thermonuclear Experimental Reactor, the world's largest fusion reactor now under construction in France.

China has completed the design of its next-generation artificial sun, called the China Fusion Engineering Test Reactor (CFETR), which aims to be the world's first fusion demonstration reactor. Once completed around 2035, CFETR will produce a massive quantity of heat with a peak power output of up to 2 gigawatts.

INDIA

[New Method of Visual Detection of SARS-CoV-2](#)

Researchers from DBT-National Institute of Animal Biotechnology (NIAB) and Gandhi Medical College developed a rapid and robust platform for early and on-field detection of SARS-CoV-2 virus. The developed LFIA works on the principle of antigen-antibody interaction holds the potential to be used for detection of SARS-CoV-2 without any requirement of skilled personnel. The fabricated LFIA works in a sandwich format, where the receptor binding domain (RBD) target in the sample interacts with the gold nanoparticle conjugated RBD antibody to form a complex (AuNPs-Ab), which further moves along the nitrocellulose membrane and reacts with the RBD antibody coated test line on the membrane to form a red colour band. The presence of band colour at test and control line indicates a positive result whereas a single line in control indicates a negative result. A simple smartphone-based application is used for analysis of the test line colour. The developed LFIA strips can be useful as a portable, point of care device (PoC) for on-site detection of SARS-CoV-2 particularly at home or even in rural areas. Moreover, the cost of LFIA strips is much less as compared to standard RT-PCR test making it a more economical option for people who cannot afford the RT-PCR test.

[ISRO Tests the Reusable Launch Vehicle](#)

Indian Space agency, ISRO, along with DRDO and Indian Air Force, successfully conducted the Reusable Launch Vehicle Autonomous Landing Mission (RLV LEX). The test was conducted at the Aeronautical Test Range (ATR), Chitradurga, Karnataka in the early hours of April 2, 2023. The RLV, which is essentially a space plane, took off at 7:10 am IST by a Chinook Helicopter of the Indian Air Force as an underslung load and flew to a height of 4.5 km. Once the predetermined pillbox parameters were attained, based on the RLV's Mission Management Computer command, the RLV was released in mid-air, at a down range of 4.6 km. The release of RLV was autonomous. RLV then performed approach and landing manoeuvres using the Integrated Navigation, Guidance & control system and completed an autonomous landing on the ATR air strip at 7:40 AM IST. With that, ISRO successfully achieved the autonomous landing of a space vehicle. The autonomous landing was carried out under the exact conditions of a Space Re-entry vehicle's landing —high speed, unmanned, precise landing from the same return path— as if the vehicle arrived from space. With LEX, the dream of an Indian Reusable Launch Vehicle arrives one step closer to reality.

[India's LIGO Project Approved](#)

India's Union Cabinet has approved a gravitational-wave detector project in Maharashtra costing Rs 26 billion, estimated to be built by 2030. A 174-acre land has been acquired in Hingoli district for its development. LIGO-India, the third observatory of its kind, will be built to match the specifications of the LIGO observatories in the US, and will work alongside them. Currently, the project is being collaboratively worked upon by a consortium of Indian research institutions and U.S. observatories along with various international partners. The L-shaped LIGO instrument boasts two arms, each measuring 4 km long. Laser pulses are fired simultaneously through both

arms, bouncing off the mirrors at the ends to return to the vertex. A detector analyses whether the pulses coincide upon return. Detecting gravitational waves involves recording and analysing the slightly out of time pulses in the detector produced by their passage. Two LIGOs can detect gravitational waves, but a third observatory is needed for better 'triangulation'. Four observatories are even better. Italy and Japan are upgrading detectors with this setup in mind to enhance gravitational wave detection. The Department of Atomic Energy and the Department of Science and Technology are building LIGO-India in partnership with the U.S. National Science Foundation and various national and international research institutions. The United States will supply critical lab components valued at approximately Rs 5.60 billion.

Extended Range Anti-Submarine Rocket Tested

The ER-ASR was designed by Pune-based Armament Research and Development Establishment (ARDE) and High Energy Materials Research Laboratory (HEMRL) of the DRDO. It is designed to intercept submarines at specific depths. During the maiden tests conducted from Navy's guided missile destroyer INS Chennai, the performance of the rocket system was evaluated at the short range of 2.7 kilometres and in long range mode at 8.5 kilometres. The rocket system will be deployed in anti-submarine operations and will be fired from an indigenised rocket launcher mounted on board various Indian naval ships. ER-ASR can be fired in single or in salvo mode depending on the tactical mission requirements. The maiden successful test from the ship is a step towards enhancing the capability of the Indian Navy in anti-submarine warfare and towards achieving 'Atma Nirbharta' in defence. ER-ASR has been designed to replace the existing Russian-origin Rocket Guided Bombs (RGBs) which are already fitted in ships. While the RGB has a range of five kilometres, the ER-ASR can achieve a range over eight kilometres.

IISER Thiruvananthapuram Forges International Collaborations for Quantum Communication

A team led by the Indian Institute of Science Education and Research (IISER) Thiruvananthapuram has shown that there is one use for quantum contextuality – quantum communication. The researchers have shown one use for quantum contextuality – quantum communication. So far, it was thought that quantum communication is caused by a phenomenon called “quantum entanglement”, famously described by Einstein as “spooky action at a distance”. Quantum entanglement. Using techniques of graph theory, scientists have shown that quantum contextuality can provide a quantum advantage (the ways in which a quantum system performs better than a classical system) in distributed computation and in various communication protocols without requiring entanglement. They have, in fact, shown a two-way link between quantum contextuality and quantum advantage.

IISc's Micro Supercapacitor Could Power E-cars and Medical Devices

Researchers at the Department of Instrumentation and Applied Physics (IAP) in the Indian Institute of Science (IISc) have designed a tiny device capable of storing an enormous amount of electric charge. The novel ultra-micro supercapacitor is smaller and more compact than existing supercapacitors and can potentially be used in devices ranging from streetlights to consumer electronics, electric cars and medical devices, etc. The IAP researchers fabricated their supercapacitor using Field Effect Transistors (FETs) as the charge collectors, instead of the metal oxide-based electrodes with poor electron mobility that existing capacitors use. The team built hybrid FETs with molybdenum disulphide (MoS₂) and graphene — to increase electron

mobility — and connected them to gold contacts, to design the supercapacitor. The team found that under certain conditions, the device’s electrochemical capacitance increased by 3,000 per cent.

UIDAI and IIT Bombay to Develop Touchless Biometric Capture System

The Unique Identification Authority of India (UIDAI) and Indian Institute of Technology, Bombay (IIT-Bombay) have developed a robust touchless biometric capture system for easier usage by people anytime, anywhere. The group is building a mobile capture system for fingerprints along with a liveness model integrated with the capture system. The new system is expected to capture multiple fingerprints at one go and aid authentication success rate further. It will use an intelligent combination of signal/image processing and machine learning/deep learning with a common mobile phone available to most citizens with a good user experience. This will be a step forward in making Universal authenticator a reality.

Secure Maritime Communications Using Quantum Technology

The Department of Science and Technology (DST) has signed a Memorandum of Understanding (MoU) with the Indian Navy for developing secure maritime communications using Quantum Technology. Under the agreement, Raman Research Institute Quantum Information and Computing (QuIC) lab will lead the research efforts towards developing quantum key distribution techniques. QuIC lab has been leading the research in the field of secure quantum communication. Some of its major achievements include the development of an end-to-end simulation toolkit named 'qkdSim', ensuring safety in communication platforms, establishing secure communication between two buildings, and, more recently, between a stationary source and a mobile receiver.

G-20 AND GLOBAL CHALLENGES

Second G20 Employment Working Group Meeting

The 2nd Employment Working Group (EWG) Meeting under India’s G20 Presidency at Guwahati, Assam has moved towards consensus on the key elements of the Ministerial Declaration and Outcome Documents covering the three priority areas of the EWG under the Indian Presidency. The priority areas for EWG 2023 are: (i) Addressing Global Skill Gaps, (ii) Gig and Platform Economy, and Social Protection, (iii) Sustainable Financing of Social Security. Over 70 Delegates from over 19 G20 member countries, 7 guest countries and 5 International Organisations including International Labour Organisation (ILO), were present at the meeting. A Draft Ministerial Communique and Draft Outcome Document on “Gig and Platform Economy and Social Protection”, were discussed.

2nd Energy Transitions Working Group (ETWG) Meeting

The 2nd Energy Transitions Working Group Meeting (ETWG) under India’s G20 Presidency concluded successfully in Gandhinagar, on April 3, 2023. The two-day meeting witnessed participation of over 100 delegates from G20 member countries, 10 special invitee countries and 14 International Organisations. Building on the discussions from the 1st ETWG (held in Bengaluru from Feb. 5-7, 2023), Member countries engaged in constructive discussions and deliberations focusing on key priority areas. The proposed formation of Global Biofuels Alliance received wide-ranging support. Discussions covered low-cost financing for energy

transition, addressing technology gaps, and aligning with other global organisations such as Clean Energy Ministerial (CEM), Mission Innovation (MI) and RD20 to achieve tangible outcomes. Protecting intellectual property rights in the context of technology transfer was also emphasized. It was also agreed to continue with a focus on deployment of clean mature technologies such as Solar PV and Offshore Wind. Side events were held on ‘Green Hydrogen – Advancing Net Zero Pathways,’ ‘Diversified Renewable Energy Supply Chains for Advancing Energy Transitions’ and ‘Accelerating Cooling as a key enabler towards energy transition’. The discussions will be taken forward in the 3rd Energy Transitions Working Group Meeting, scheduled to take place in Mumbai from May 15-17, 2023.

Shaping Future Policies at Y20

The Indian Institute of Technology (IIT) Kanpur hosted the Youth 20 (Y20) Consultation under the G20 Presidency of India, from 5th-6th April. The Y20 Consultation is a platform that brings young people together to connect, share ideas and experiences and deliberate on finding innovative solutions to pressing global concerns. The meeting discussed “Future of Work: Industry 4.0, Innovation, & 21st Century Skills”; and “Health, Well-being & Sports: Agenda for Youth” Apart from the panel discussions, a grand exhibition was organized as part of the Y20 Consultation. The exhibition is to showcase science and innovation, and education, along with tech by start-ups from the Startup Incubation and Innovation Centre (SIIC), IIT Kanpur.

Researchers Back African Union to Join G20

Prominent researchers are backing the inclusion of the African Union (AU) in the G20, a forum in which most of the world’s largest economic powers discuss and propose solutions to pressing global issues. South Africa is the only African country in the group. The researchers make this call in an ethics-policy document called ‘[Advocating for a G21](#)’ launched on 6 April at a G20 side-event in Kumarakom, India. The report’s 11 authors include Prof. Sachin Chaturvedi, director-general of the New Delhi-based think tank Research and Information System for Developing Countries, which is supported by India’s Ministry of External Affairs. The inclusion of the African Union would bring all 55 African countries into the G20, thus giving representation to 54 countries more than the status quo, at the cost of just one additional seat according to the authors.

IN BRIEF

Delivering Time-released Drugs, Vaccines for Months

Researchers from Rice University have developed technology for making time-released drugs by encapsulating medicine in microparticles that dissolve and release drugs over time. Dubbed PULSED (short for Particles Uniformly Liquified and Sealed to Encapsulate Drugs), the technology employs high-resolution 3D printing and soft lithography to produce arrays of more than 300 nontoxic, biodegradable cylinders that are small enough to be injected with standard hypodermic needles. The cylinders are made of a polymer called PLGA that's widely used in clinical medical treatment. The team developed four methods of loading the microcylinders with drugs, made particles with diameters ranging from 400 microns to 100 microns and showed they could tweak the PLGA recipe to vary how quickly the particles dissolved and released the drugs -- from as little as 10 days to almost five weeks. They also developed a fast and easy method for

sealing the cylinders, a critical step to demonstrate the technology is both scalable and capable of addressing a major hurdle in time-release drug delivery. In many cases, it would be ideal for patients to have the same amount of a drug in their systems throughout treatment. McHugh said this size enables particles to stay where they are injected until they dissolve, which could be useful for delivering large or continuous doses of one or more drugs at a specific location, like a cancerous tumour.

[Anticancer Nanoparticles with Ultrasound Activation](#)

An international research team led by Ruhr University Bochum, Germany, has developed an anti-cancer complex that accumulates in tumour tissue and is activated there by ultrasound waves. The treatment method with ultrasound activation penetrates several centimetres deep into the body. The method uses Platinum (IV) complex prodrugs which are completely harmless in healthy tissue, but in cancer tissue, however, they can be rapidly converted into the therapeutically active platinum (II) complexes, using sonosensitizers and ultrasonic energy. To develop a therapeutically effective complex, the researchers encapsulated the platinum (IV) complex prodrugs and the sonosensitizers together in haemoglobin to form nanoparticles. The nanoparticles selectively accumulated in a mouse intestinal tumour after injection into the bloodstream. After irradiation with ultrasound, the platinum (IV) prodrug was activated at the tumour site, triggering the release of cisplatin, which is toxic to cells, and almost completely eradicating the tumour. These results could pave the way for the development of novel techniques and agents for the treatment of very large or deep-seated tumours.

[Combined Water-Saving and Nuclear Irrigation Technique](#)

With support from the IAEA and the Food and Agriculture Organization of the United Nations (FAO), farmers in Namibia, are now using a combination of nuclear techniques and a water-saving irrigation technology, known as small-scale drip irrigation, for watering their fields. Based on cosmic ray neutron sensors, which provide real-time data on soil moisture, it has allowed farmers to deliver small but precise amounts of water directly to the plants. The drip irrigation project which started in 2020 has helped increase irrigation water use efficiency by over 80 per cent compared to rainfed agriculture, and has improved yields by up to 70 per cent in the farmers' fields that were part of the project. The installation of the small-scale drip irrigation system with the help of the irrigation information – when and how much to apply – has helped to increase the production of crops in my farm from a one-time to almost all-year-round. The small-scale, solar-powered drip irrigation equipment capable of filling a 10,000-litre water tank within an hour. Drip irrigation provides the minimum amount of water needed for crops to flourish and thrive, to mitigate the effects of unprecedented droughts at any crop growth stages, helping local farmers substantially increase yields with less water and prevent water loss due to evaporation.

RESOURCES & EVENTS

[Spectrum Management Issues for Space-communications](#)

Broadband from space promises to be a new frontier to increase Internet access in India's underserved population. But allocation of spectrum for space communications among stakeholders has challenges. While a majority of the parties interested in the future of space communication technology argue for administrative allocation of spectrum as is the global norm,

there is support for an auction for the frequency bands. The issue concerns the spectrum availability in 24.25-28.5 GHz, including the 27.5-28.5 GHz for IMT/5G. Unlike terrestrial spectrum which is used for mobile communications, by its very nature, satellite spectrum has no national territorial limits and is international in character. It is therefore coordinated and managed by the UN agency, International Telecommunications Union (ITU). The Indian enterprise OneWeb had strongly recommended administrative allocation and charge a fee in order to promote investment and make sure competitive prices are available to the market at the end. The assignment of orbital /spectrum resources for satellites is globally coordinated at ITU level, and given administratively world over, and it is suggested that the same should also be followed by the Indian administration.

ICJ Advisory Opinion Sought on Climate Obligations of States

The UN General Assembly (UNGA) has adopted a resolution requesting the International Court of Justice (ICJ) for an advisory opinion clarifying States' obligations under international law to protect the climate system from anthropogenic greenhouse gases (GHG) emissions "for States and for present and future generations." The UNGA is seeking clarification of the legal consequences where States, by their acts or omissions, "have caused significant harm to the climate system and other parts of the environment," with respect to: states, and small island developing States (SIDS) in particular, that are "specially affected by or are particularly vulnerable to the adverse effects of climate change"; and Peoples and individuals of the present and future generations affected by such adverse effects. Spearheaded by the Pacific Island nation of Vanuatu, the resolution (A/77/L.58) was co-sponsored by more than 130 developing and developed countries. Although the ICJ's advisory opinions are not legally binding, they carry legal authority and moral weight.

UN Report Details Actions to Minimize Negative Impacts of Pesticides

In response to a 2017 request by the UN Environment Assembly (UNEA), the UN Environment Programme (UNEP), in collaboration with the World Health Organization (WHO) and the Food and Agriculture Organization of the UN (FAO), produced a report on the adverse impacts of pesticides and fertilizers and what can be done to minimize them. The report reviews relevant management practices, legislation, and policies. Key findings from the report include that: (1) links exist between exposure to pesticides and certain health outcomes, with an estimated 385 million cases of pesticide poisonings and 11,000 deaths every year; (2) pesticides and their degradation products are ubiquitous in the environment, often detected at levels exceeding environmental standards; (3) adverse impacts of fertilizers are mainly caused by their excessive and inefficient use, resulting in nutrient losses to the environment, drinking water contamination, and eutrophication of freshwater systems and coastal zones; and (4) knowledge gaps still exist that hinder a comprehensive understanding of some mechanisms and processes leading to the adverse impacts of pesticides and fertilizers. The report also describes a range of priority actions to reduce adverse impacts and address knowledge gaps, focusing on methodologies, tools, approaches, and policies to strengthen pesticide and fertilizer management.

IISER Inaugurates STEM Lab

A tinkering experience centre in science, technology, engineering, and mathematics (STEM) education was inaugurated at the Indian Institute of Science Education and Research (IISER) Pune, to promote STEM education in schools. The centre is equipped with state-of-the-art tools

which could enable students to engage in STEM-based activities. The activity is part of the STEM project being conducted at IISER Pune's Science Activity Centre in collaboration with Tata Technologies.

SII India Produces 'High Efficacy' Malaria Vaccine

A University of Oxford developed and Serum Institute of India (SII) manufactured and scaled up "high efficacy" malaria vaccine has been licensed for use in Ghana by Africa's Food and Drugs Authority. The R21/Matrix-M vaccine, leveraging Novavax's adjuvant technology, has been approved for use in children aged 5 to 36 months – the age group at the highest risk of death from malaria. It marks the first regulatory clearance for the R21/Matrix-M malaria vaccine for use in any country. The R21/Matrix-M malaria vaccine is a low-dose vaccine that can be manufactured at a mass scale and modest cost. SII India is committed to scaling up production of the vaccine to meet the needs of countries with high malaria burden and to support global efforts towards saving lives. The R21/Matrix-M vaccine has undergone clinical trials in the UK, Thailand, and several African countries. The vaccine contains Novavax's Matrix-M, a saponin-based adjuvant that enhances the immune system response, making it more potent and more durable. The Matrix-M adjuvant stimulates the entry of antigen-presenting cells at the injection site and enhances antigen presentation in local lymph nodes. This technology has also been used in Novavax's Covid-19 vaccine and is a key component of other development-stage vaccines. SII has already established potential manufacturing capacities of more than 200 million doses annually.

SCIENCE POLICY AND DIPLOMACY

Indian Space Policy 2023 Approved

The Union cabinet of India on April 6 approved the Indian Space Policy 2023 to further boost the segment and enhance the role of start-ups and other private entities working in the space. The Indian government's push for innovation in space-tech has led to many start-ups driving innovations in different sub-segments such as building rockets and launchpads, enhancing satellite mapping, and more. The Indian Space Policy 2023, would offer clarity to the role of each actor to enhance the role of the space dept to give a boost to the activities of the ISRO missions and to have a larger participation between the research, academia, start-ups, and the industry. The policy has laid down the roles and responsibilities of organisations like the Indian Space Research Organisation (ISRO) and other private entities. The Indian National Space Promotion and Authorisation Centre (IN-SPACe) was launched in 2020, as a single-window, independent, nodal agency functioning as an autonomous agency in the Department of Space (DOS). Meanwhile, New Space India Limited (NSIL) was also incorporated in 2019 as a wholly-owned Government of India company to enable public-private partnerships. Within three years, there were almost 150 start-ups with ISRO. Rs 1.75 billion was generated towards the export of launch services, data sales, and in-orbit support services and post-launch operations in 2021-22. Several Indian space tech start-ups have also started working on a global scale. For instance, Pixxel has bagged a five-year contract with a US defence agency for supplying technical hyperspectral imagery. India's space economy is set to become a \$600 Bn market by 2025, growing at a CAGR of 6 per cent between 2020 and 2025.

Viral Research And Biosafety Concerns

The US Department of Energy (DoE) has concluded that the Covid-19 pandemic most likely arose from a laboratory leak, according to media reports. The report was followed by first on-the-record admission by the US Federal Bureau of Investigation (FBI) that it believes in the lab-origin of COVID-19. These revelations have also coincided with US Congressional reports and email disclosures that show that top Western experts discussed lab-leak possibility privately but dismissed it publicly. Now it's understood that there is no conclusive evidence behind the so-called consensus on natural-origin of COVID-19. On the other hand, there is strong circumstantial evidence pointing to the possibility of a lab-leak, possibly a lab accident. The basic idea behind a potential lab-origin of COVID-19 is that improper and unsafe handling of viruses, most likely during complex and experimental risky research, would have led to the leakage of the virus that then spread from person to person. There are several examples of viruses leaking from labs and causing infections including the SARS virus and H1N1. A US Congressional report noted biosafety failures and concerns in Chinese labs carrying out risky coronavirus research, including what's called the gain of function (GoF) research. At the centre of biosafety concerns is a particular kind of risky work called 'gain of function' (GoF) research that was long advocated as being essential to prevent the next pandemic. There are increasing demands for better oversight and regulation of such research.

ISA Council Agrees to Intersessional Work on Draft Exploitation Rules

The Council of the International Seabed Authority (ISA) advanced the negotiations on the draft exploitation regulations. It also adopted a decision on the understanding of the so-called "two-year rule," which was triggered by Nauru's application on 9 June 2021. The deadline for completing the development of exploitation regulations is ending on 9 July 2023. The Council agreed to undertake further intersessional work on the draft exploitation regulations, including the establishment of several informal groups and deadlines for the submission of comments: 15 May 2023 on the revised draft text; and 1 June 2023 on the outcomes from the intersessional working groups. The Council adopted decisions on: the establishment of the position of an interim director general of the Enterprise – the Authority's commercial arm; and the understanding and application of provisions relating to the Implementation of Part XI of the UN Convention on the Law of the Sea (UNCLOS), on the two-year rule. For more see <https://enb.iisd.org/sites/default/files/2023-04/enb25251e.pdf>.

ICT to Accelerate SDGs and Build Back Better

The 2023 edition of the World Summit on the Information Society (WSIS) Forum (Geneva, Switzerland, 13-17 March 2023) discussed the role of information and communication technology (ICT) in accelerating the achievement of the SDGs and building back better. The WSIS stakeholder community also assessed implementation of the WSIS Action Lines for sustainable development. The WSIS Forum 2023 featured high-level policy sessions, a ministerial round table, and high-level dialogues. Discussions focused on: bridging digital divides; enabling environment for digital technologies, inclusiveness, and access to knowledge for all; digital economy and trade; ethical dimensions of ICT; climate change; knowledge societies; and capacity building. The Chairperson's Summary of the Forum identifies three main takeaways: (1) Access, availability, and affordability should be the driving forces of digitalization; (2) Digital education and digital skills play a crucial role in the adoption of digital technologies; (3) Trust in digital technologies is key and can only be achieved by developing a human-centric and human rights-based approach to digital technologies that is fully inclusive.

Numerous challenges remain such as the lack of access to high-speed internet, inadequate investment in ICT infrastructure development, limited availability of affordable devices, lack of digital literacy among marginalized populations, and limited access and low adoption of e-services. To address these barriers, the Chairperson's Summary proposed some actions. The Forum also considered the achievements along the 11 WSIS Action Lines. More at <https://www.itu.int/net4/wsis/forum/2023/Home/Outcomes>.

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RIS Science Diplomacy Programme (fisd.in) is glad to present a new version of Science Diplomacy News Alerts, following India's assumption of the Presidency of the G20. A new section G20 and global challenges has been added. We request your cooperation to review the Alerts and improve its content. For this purpose, please complete the form at <https://forms.gle/o4d869FxaM9t3KNw7>, and submit it. Your support and cooperation is appreciated.